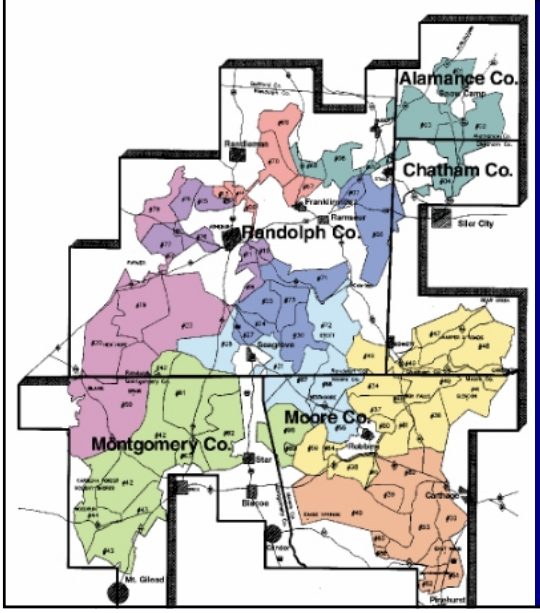
RUS 2006 Engineering Seminar

Implementing GIS

Dennis Mabe
Randolph EMC

REMC Territory

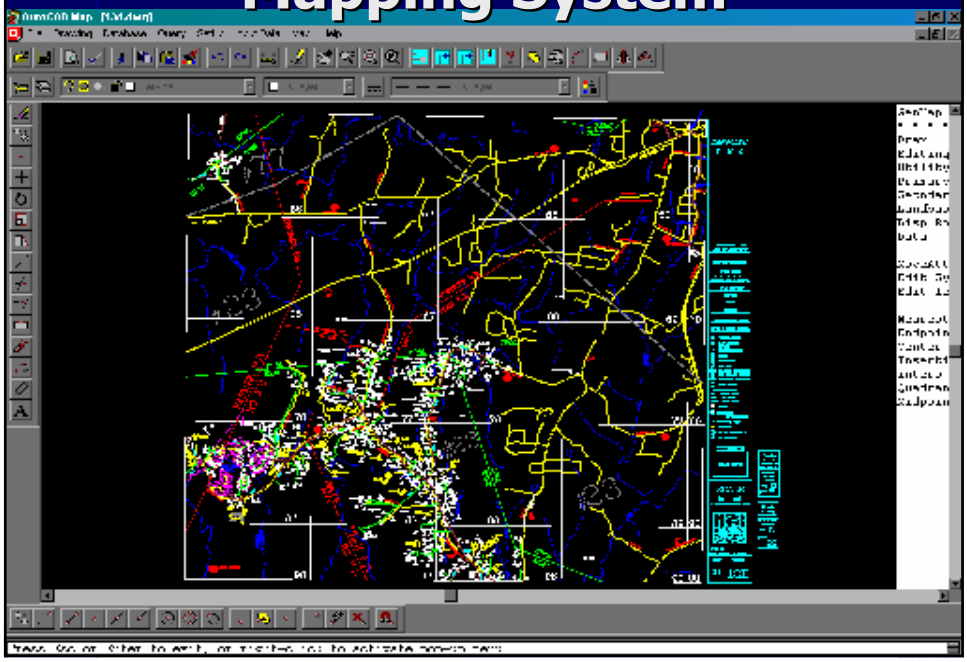


- Service Area in the Center of North Carolina
- 31,000 members
- Parts of 5 counties
- 21 Substations
- 72 Feeders
- 80,000 poles
- 4,400 miles of line

Existing Mapping System

- Started first digitized maps in 1989
- AutoCAD – Gentry Systems
- Approximately 80 individual maps
- System field drawn on digitized USGS Maps NCNAD27

Mapping System



Automated Staking

- Implemented automated staking with existing AutoCAD maps
- Integration with CIS
- Map Viewing Capabilities

Automated Staking

- Realized benefits early on
  - Time savings
    - One time entry of data
    - Automated process of assembly data
  - Improved Accuracy
- Realized the need for change in base maps

Things we wanted from existing system

- One stop shop for updating facility data
  - STOP the multiple entries of the same data
- Reporting Capabilities
- Interfaces
  - Import Staking drawings
  - CIS
  - Engineering Analysis

Decision to Implement GIS

- Strategic Planning Committee
  - Existing System not able to meet goals
  - Lay the ground work for future needs
    - Detailed Engineering Model
    - Intelligent Staking Data
    - Implementation of Outage Management
    - Complete Integration of necessary Data

GIS Benefits

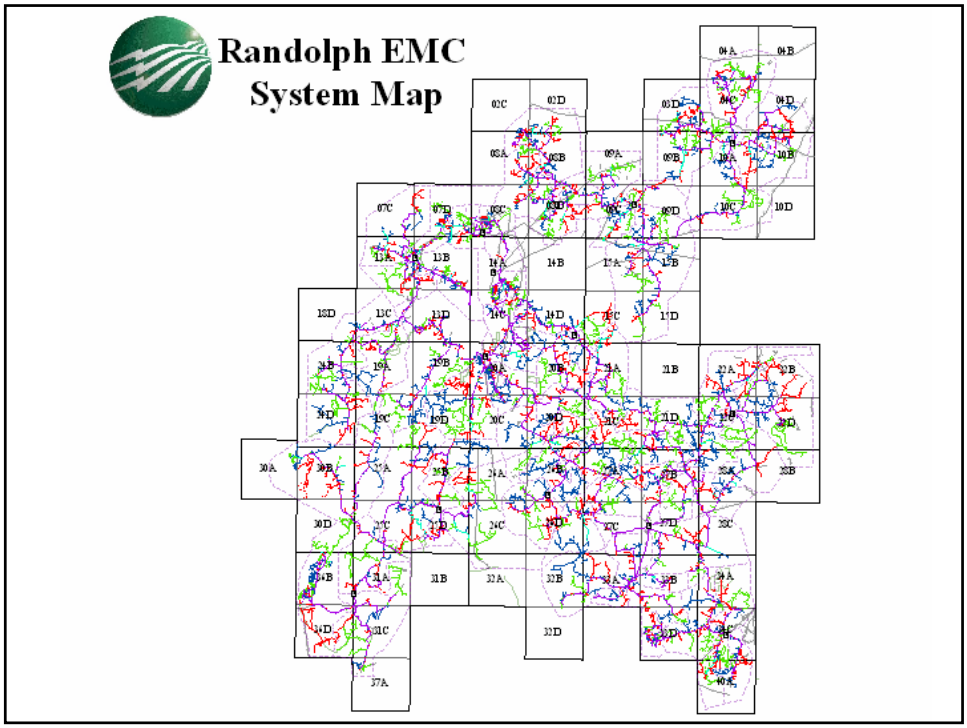
- Seamless Map of Distribution System
- Asset Database
- Electrical Connectivity Model
- Tool for Analysis and Reports
- Integration with other systems
  - CIS
  - Automated Staking
  - Engineering Analysis
  - Outage Management

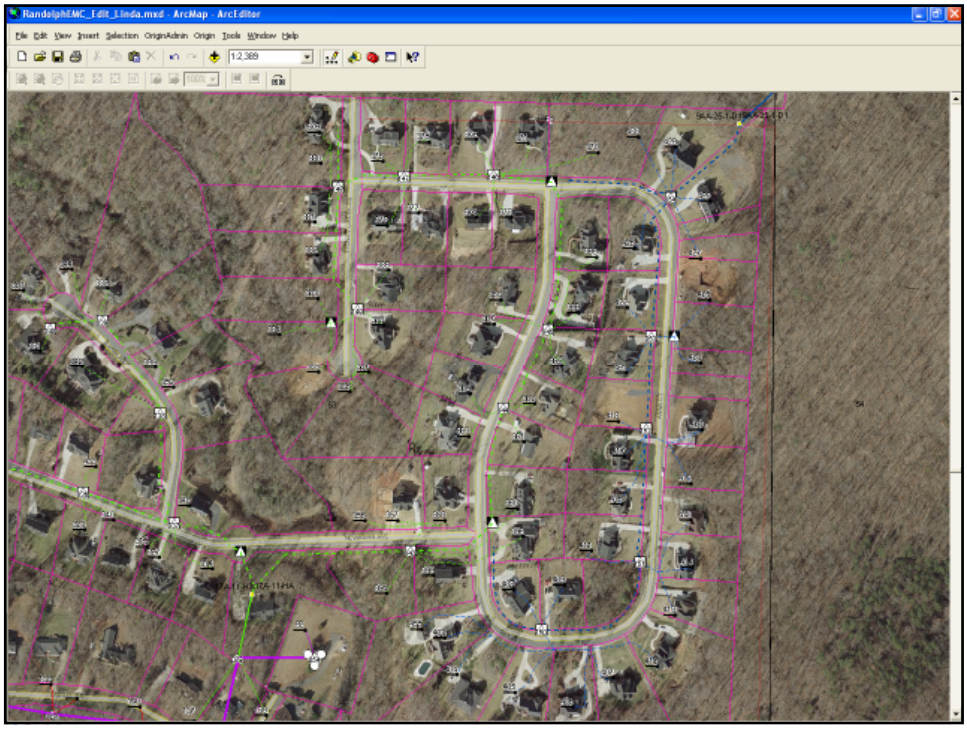
Decision Process to Implement GIS

- Vendor search
  - Reviewed GIS products from several vendors
  - Narrowed search to 2 vendors
    - In house demonstrations
    - Site Visits
- Selected Origin GeoSystems

Implementation

- Identified current goals and needs from GIS
- Compiled data sources for conversion
  - CAD drawings
  - Access databases
  - Text files
- ArcSDE
- Determined Network Features
- Initial Custom Symbology
- Froze updating of AutoCAD Maps in July
- Seamless System installed in December





GIS - Initial Lessons Learned

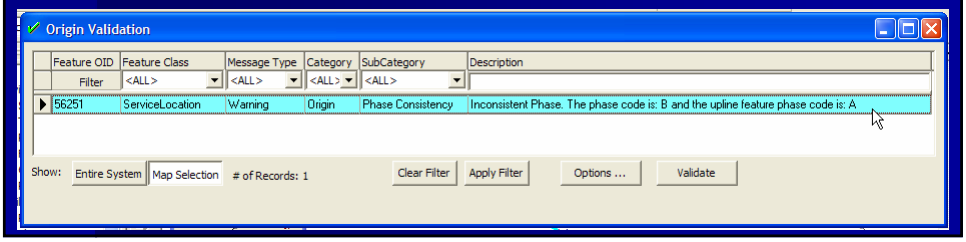
- What do we do with it?
  - Initially failed to take advantage of new system
  - Personally didn't take any ESRI training prior to installation
  - Didn't allow for the intimidation factor for CAD users
- Two additional days of training fixed these issues

Data Clean Up

- GeoDatabase is only as good as the data you put in it
- Made decision to clean up data internally
- Origin provides excellent tools for validating data

Data Clean Up

- Origin Validation
  - Identifies all electrical and data model rules violations
  - Sort and manage errors
  - Navigate and correct errors



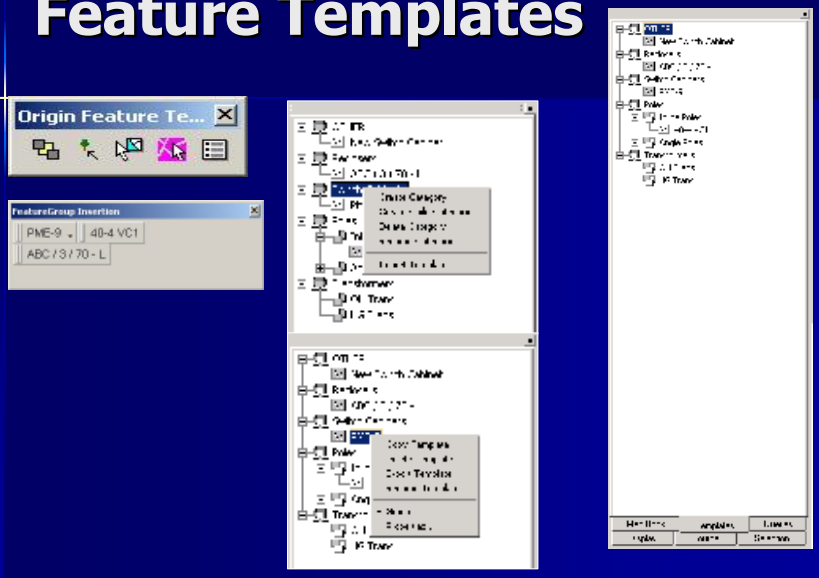
Benefits of GIS

- Seamless Map of Distribution System
  - Complete System at your fingertips
    - No more XREF'ing
  - Multiple users editing the data simultaneously
  - Conflict resolution

Benefits of GIS

- Asset Database
  - Maintain unit data
  - Ability to create feature templates
  - Provides background maps and existing facilities for Partner Staking

Feature Templates

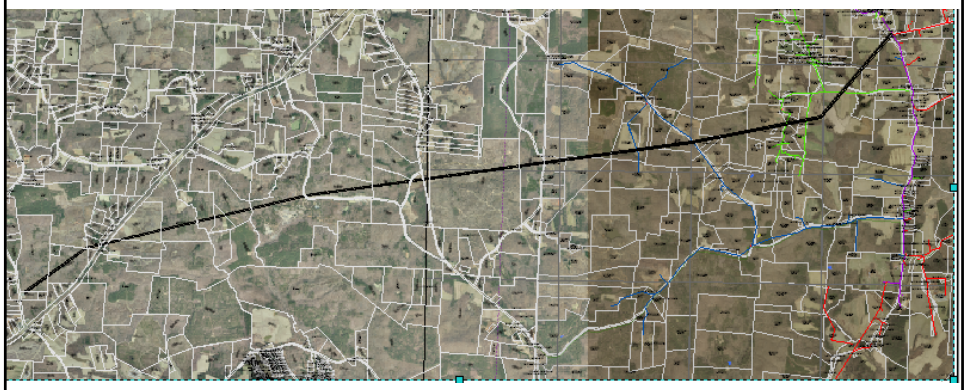


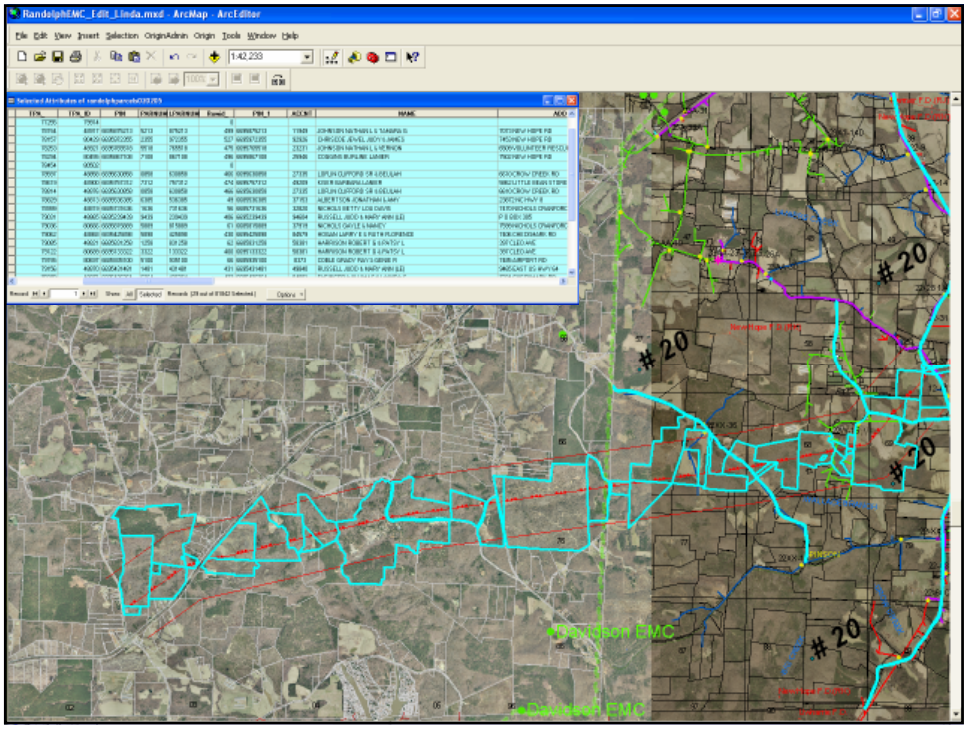
Benefits of GIS

- Electrical Connectivity Model
  - Flow of Electric Distribution System
  - Allows for Tracing Upstream and Downstream
  - Enables us to spot data entry problems early

Benefits of GIS

- Tool for Analysis and Reporting
  - Return results of tracing as drawing or selection
  - Report data based on Attributes
  - Stored Queries
  - Complete export functions for this data
    - HTML, Spreadsheet, Email
  - Easily Add third party data
    - North Carolina One Call




RandolphEMC_Edit_Linda.mxd - ArcMap - ArcEditor
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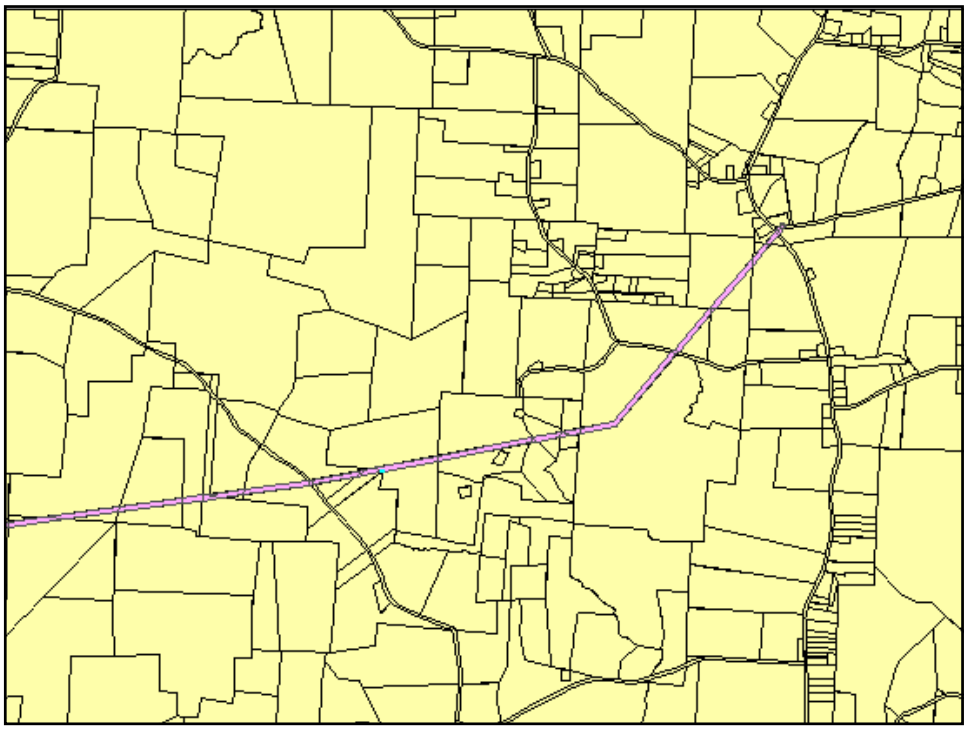
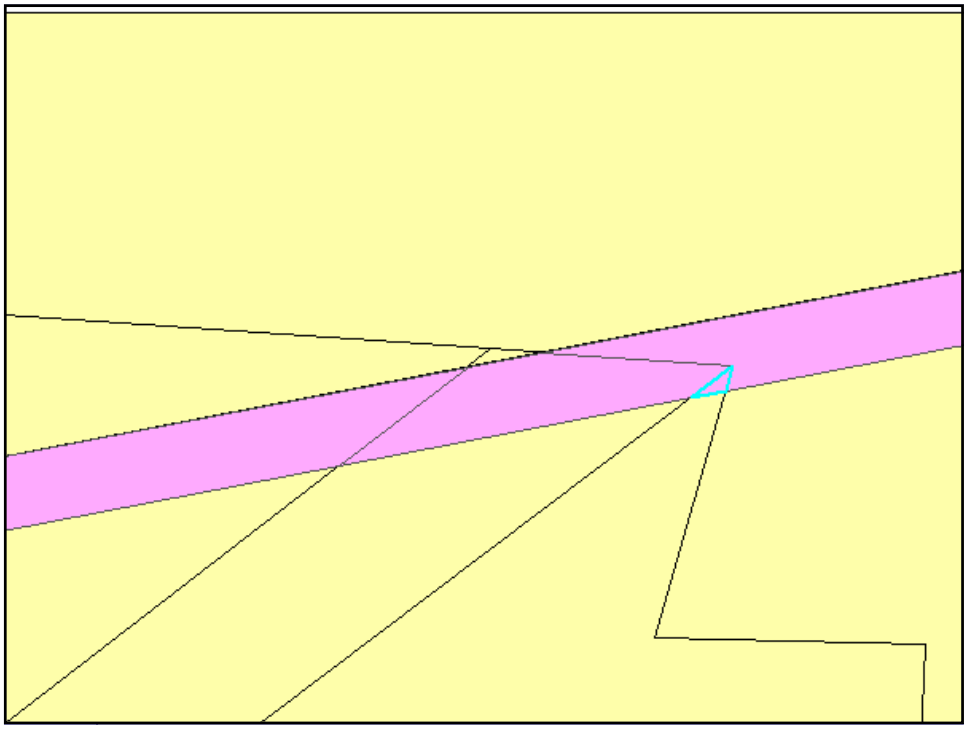
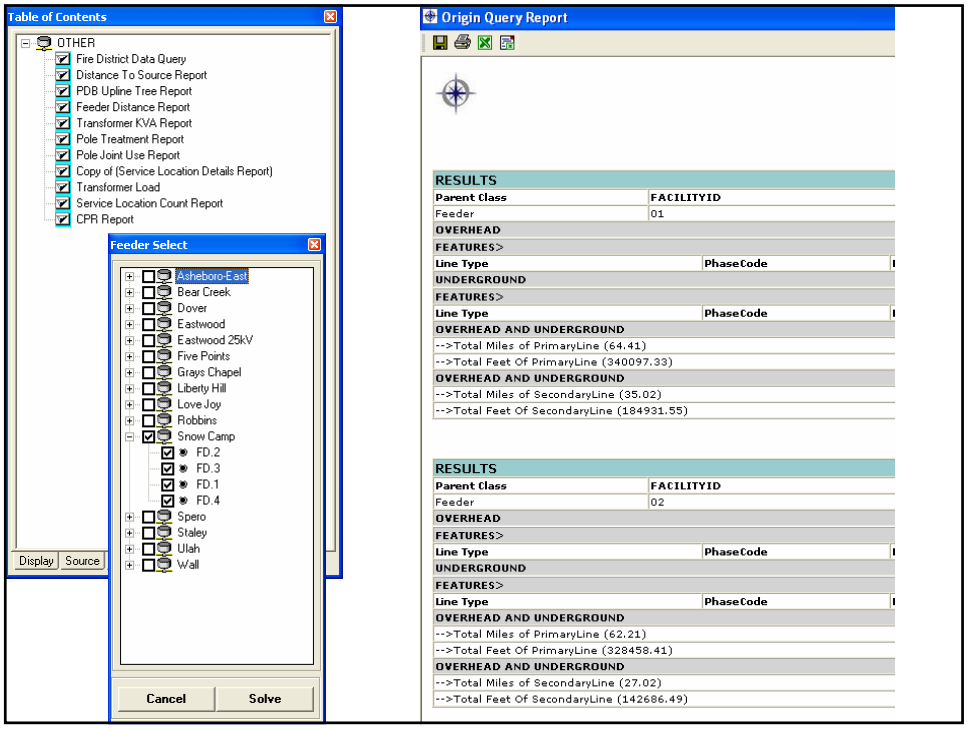
Davidson EMC
Davidson EMC



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Fire District Data Query
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PDB Upline Tree Report
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Service Location Count Report
CPR Report
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Source
Feeder Select
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Bear Creek
Dover
Eastwood
Eastwood 25kV
Five Points
Grays Chapel
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FD.2
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Spero
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Wall
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Solve
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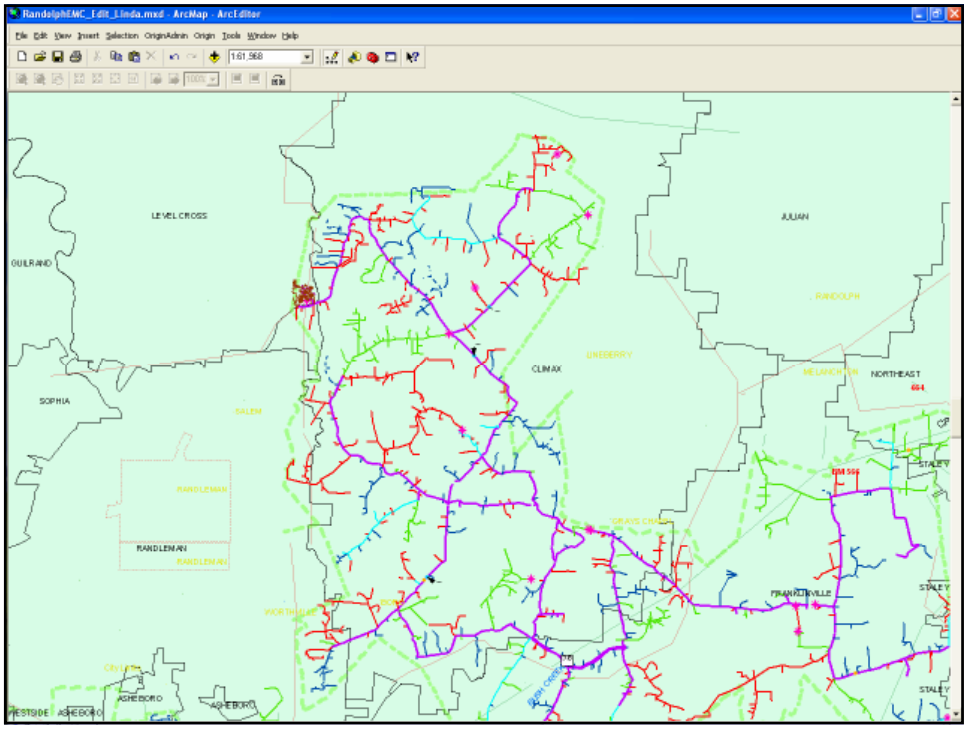
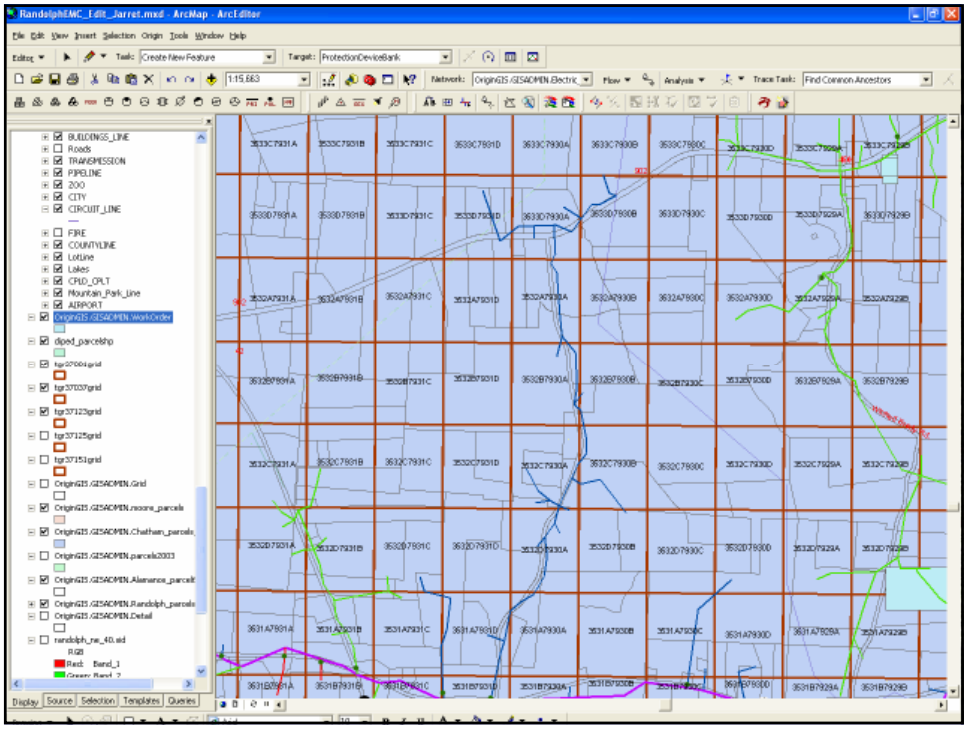
RESULTS
Parent Class
FACILITYID
Feeder
01
OVERHEAD
FEATURES>
Line Type
PhaseCode
UNDERGROUND
FEATURES>
Line Type
PhaseCode
OVERHEAD AND UNDERGROUND
-->Total Miles of PrimaryLine (64.41)
-->Total Feet Of PrimaryLine (340097.33)
OVERHEAD AND UNDERGROUND
-->Total Miles of SecondaryLine (35.02)
-->Total Feet Of SecondaryLine (184931.55)
RESULTS
Parent Class
FACILITYID
Feeder
02
OVERHEAD
FEATURES>
Line Type
PhaseCode
UNDERGROUND
FEATURES>
Line Type
PhaseCode
OVERHEAD AND UNDERGROUND
-->Total Miles of PrimaryLine (62.21)
-->Total Feet Of PrimaryLine (328458.41)
OVERHEAD AND UNDERGROUND
-->Total Miles of SecondaryLine (27.02)
-->Total Feet Of SecondaryLine (142686.49)



Origin Query Report

Feeder Distance Report (by Fire District) Query

RESULTS				
PARENT CLASS	FIRE_NAME	OBJECTID		
Randolph_firedist	CLIMAX	66		
OVERVIEW BASED OFF LINE TYPE	FEET OF LINE	MILES OF LINE		
PrimaryLine	594174.72	112.53		
SecondaryLine	363332.92	68.81		
OVERVIEW BASED OFF PLACEMENT	FEET OF LINE	MILES OF LINE		PLACEMENT
PrimaryLine	564933.72	107.00		0
PrimaryLine	29241.00	5.54		1
SecondaryLine	294587.79	55.79		0
SecondaryLine	68745.13	13.02		1
DETAILED LISTING BY LINETYPE	PHASE CODE	PLACEMENT	FEET OF LINE	MILES OF LINE
PrimaryLine	A	OverHead	192217.00	36.40
PrimaryLine	AB	OverHead	1450.83	0.27
PrimaryLine	ABC	OverHead	146803.60	27.80
PrimaryLine	AC	OverHead	20980.07	3.97
PrimaryLine	B	OverHead	102620.32	19.44
PrimaryLine	BC	OverHead	1131.38	0.21
PrimaryLine	C	OverHead	99730.52	18.89
PrimaryLine	A	UnderGround	8703.71	1.65
PrimaryLine	ABC	UnderGround	5468.49	1.04
PrimaryLine	B	UnderGround	414.88	0.08
PrimaryLine	C	UnderGround	14653.92	2.78
SecondaryLine	A	OverHead	130113.62	24.64
SecondaryLine	AB	OverHead	174.78	0.03
SecondaryLine	ABC	OverHead	1913.88	0.36
SecondaryLine	AC	OverHead	1548.45	0.29
SecondaryLine	B	OverHead	76843.67	14.55
SecondaryLine	C	OverHead	83993.39	15.91
SecondaryLine	A	UnderGround	26492.58	5.02
SecondaryLine	ABC	UnderGround	1876.94	0.36
SecondaryLine	AC	UnderGround	160.00	0.03
SecondaryLine	B	UnderGround	15046.11	2.85
SecondaryLine	C	UnderGround	25169.50	4.77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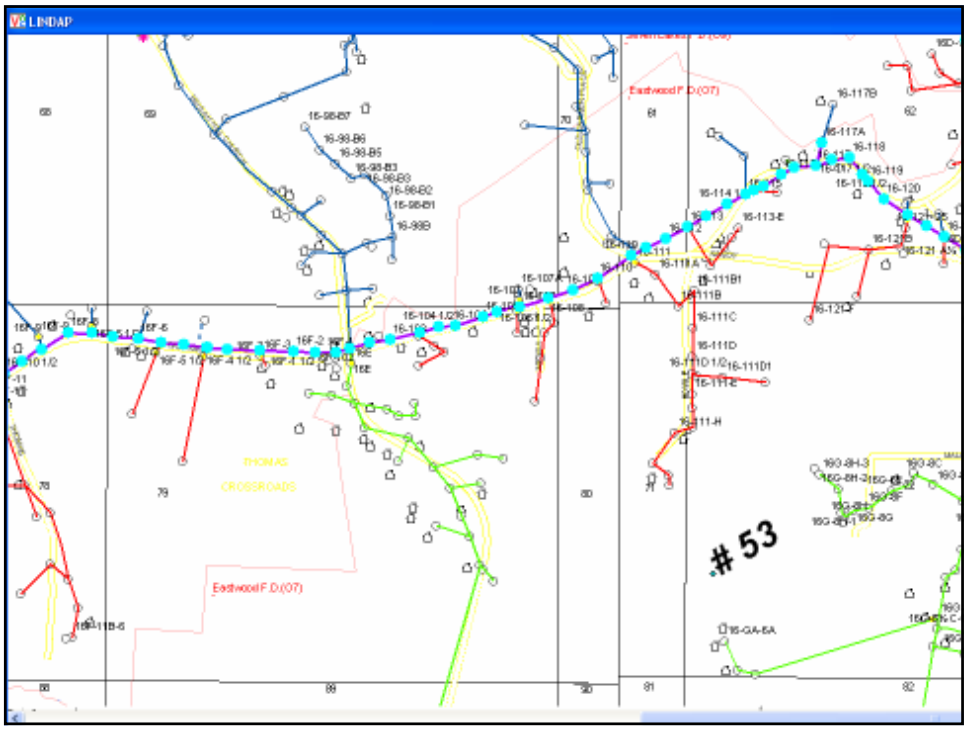
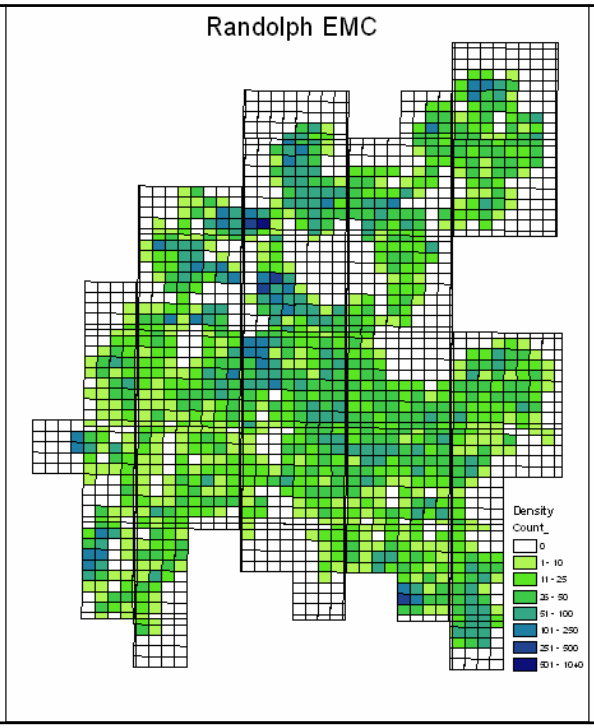

LINDAP
53
THOMAS
CROSSROADS
Eastwood F D.(07)

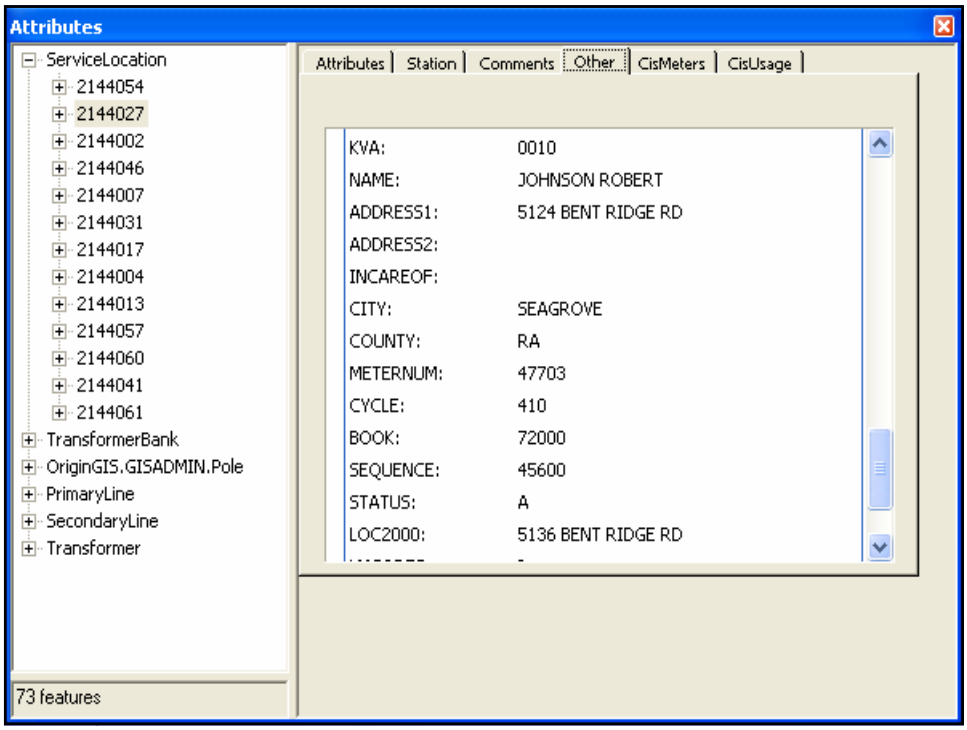
Pole Distance from Source

FACILITYID	*Distance*	*Pole Number*
3473072	0.15	16-140
3473074	0.2	16-139½
3473075	0.26	16-139
3473076	0.31	16-138½
3473069	0.38	16-138
3473003	0.44	16-137
3473024	0.47	16-136
3473029	0.56	16-135
3473049	0.63	16-134
3473068	0.68	16-133



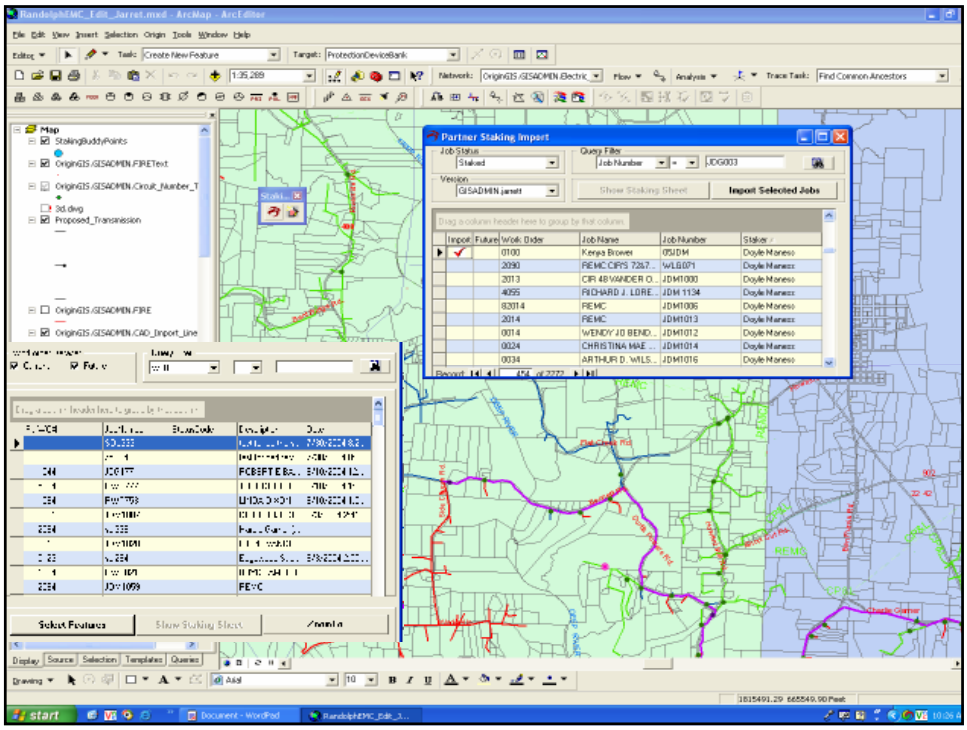
Benefits of GIS

- Integration with CIS
  - Made decision to run batch process to update GIS with CIS data until new CIS installed



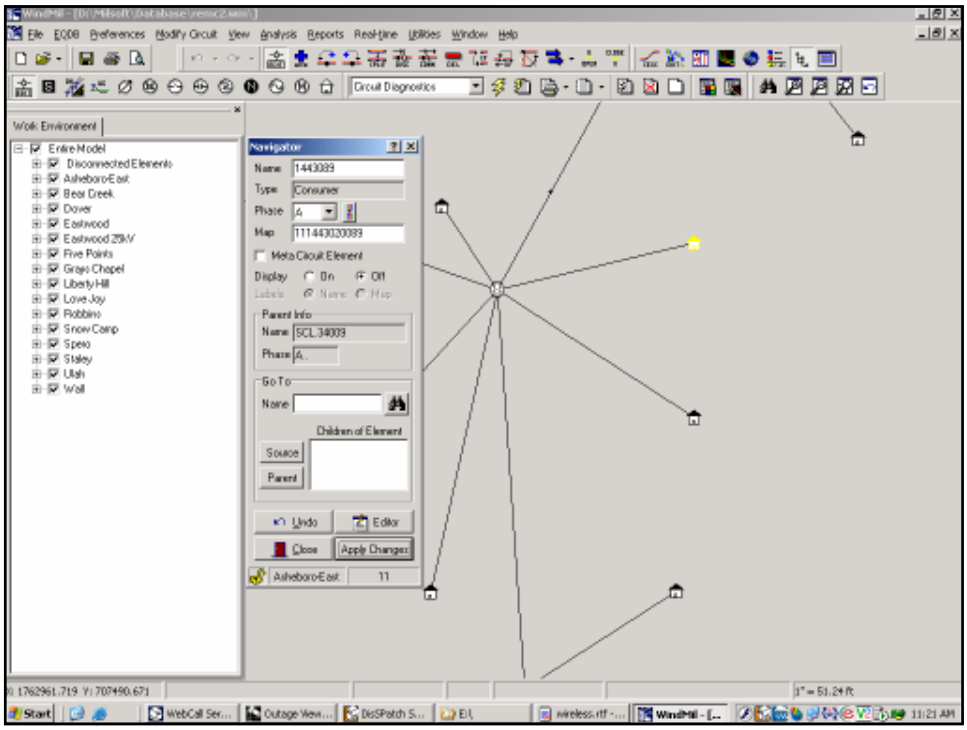
Benefits of GIS

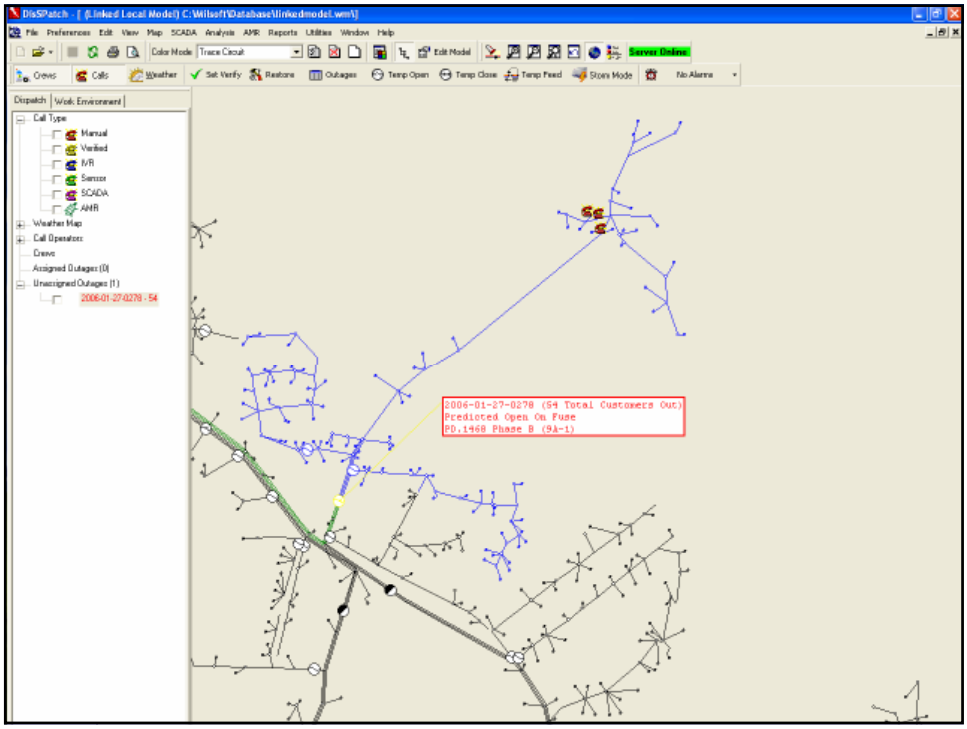
- Integration with Automated Staking
  - Application-level integration
  - Live access to Partner Hub from GIS
    - Find jobs, view staking sheets
  - Build GIS database & model on import
  - Creates historical work order database
    - Stores job header and PDF staking sheet

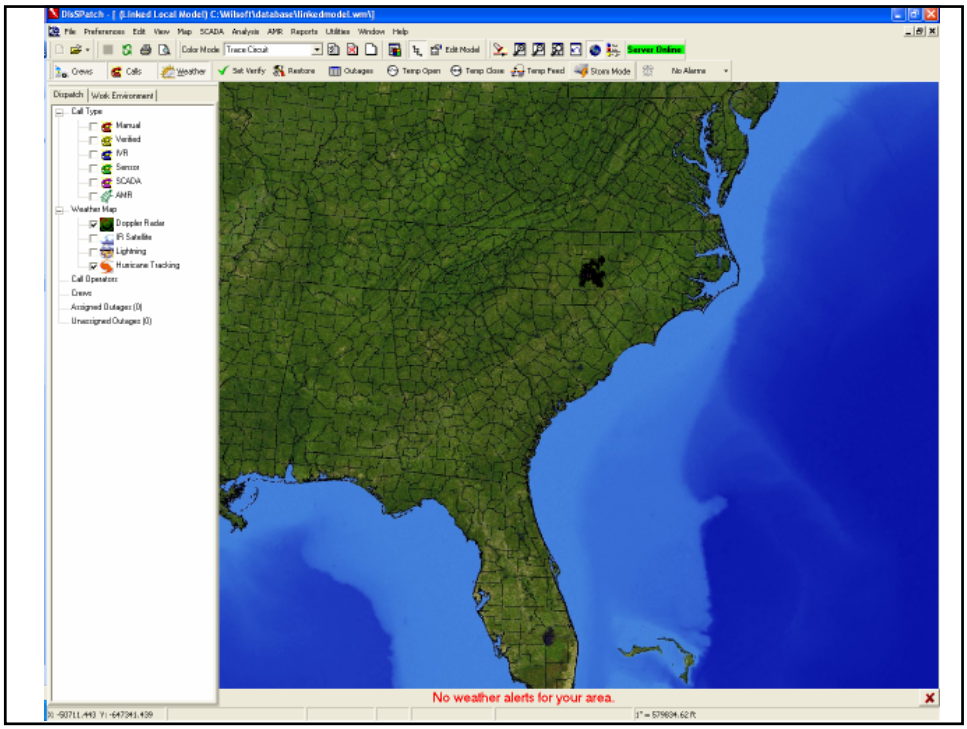


Benefits of GIS

- Integration with Engineering Analysis and Outage Management
  - Milsoft's WindMil and DisSpatch
    - Origin provides translation map table to map fields for preferred nomenclature
    - Display load flow and short circuit analysis results

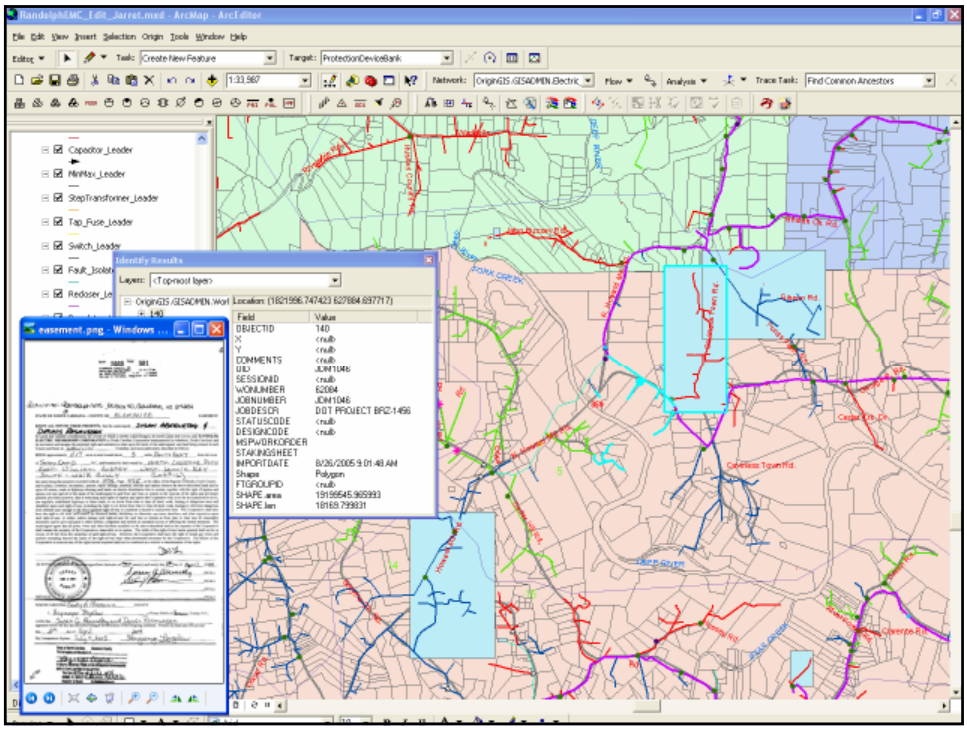



2006-01-27-0278 (54 Total Customers Out)
Predicted Open On Fuse
PD.1468 Phase B (9A-1)


No weather alerts for your area.

Future goals for GIS at Randolph EMC

- Easement integration
- Add Transmission to the network
- Enhance queries and reports
- Seamless integration with new CIS
- Seamless integration with Register of Deeds



Questions?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PARTNER
software
MILSOFT
Utility Solutions
Providing solutions today